The Economic Transition: Recognizing Total Costs

The session, moderated by Daniel Kevles, the Koepfli Professor of the Humanities at Caltech, included John Ledyard, Caltech professor of economics and social sciences; Paul Portney, vice president and senior fellow, Resources for the Future; Roger Noll, the Doyle Professor of Public Policy, Stanford University; and Alvaro Umaña.

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Daniel Kevles, during his opening remarks for the session, talked about the problem in economics of recognizing *total cost*. "If someone is concerned with developing something economically and uses a natural resource, for example a tree, there are direct costs involved in cutting down the tree, but there are also indirect costs. To cut down a tree you not only destroy the tree, you also destroy the ecosystem that the tree gives life to. You reduce the ability of the forest to absorb carbon dioxide, and you may foster soil erosion as well. These are what economists call *externalities*. It's difficult to measure these costs. You can attach a market value to them in some cases, but in many cases you cannot."

Paul Portney discussed the problem of making the transition to sustainability, suggesting that the first step must be to clearly define that state. He raised three questions.

"First, can we exploit fossil fuels, nonfuel minerals, and other nonrenewable resources in getting to this sustainable world?" He felt that it would be impossible to avoid doing so. "Second, could we use up some renewable resources—for example, a particular fishery—so long as we use the wealth generated thereby to make it possible for future generations to live better? Third, could a sustainable future be one with even greater income inequality than we suffer from today, so long as those at the bottom finally have what most of us would consider a decent life?"

Then Portney raised a fourth question: "How will we get people in the industrial democracies to care more about the less-fortunate on this planet, if in all these countries over the past 10 years, the electorate has evidenced a marked disinclination to care even about the less fortunate in the societies in which they live, where they step over the homeless on a day-to-day basis?" This last question—of how to get people to care about what they need to care about—was perhaps the most difficult of all to answer; it received considerable attention in several other sessions.

Portney went on to make a case that for some time now a number of very good economists have worried about the problem of the limits imposed on economic growth by environmental degradation and the exploitation of natural resources. "I think today we recognize the practical importance of this research more than we ever have before. In addition, lending practices of the international lending agencies now reflect this recognition."

He felt, moreover, that there is "an influence that runs in the opposite direction. That is, economic growth has a dramatic effect on individuals' demands for environmental quality. If we lay too many restrictions on developing countries, or if we don't assist them in putting in place wise environmental policies, they will have no interest whatsoever in clean air or water or the more careful management of soils, because they will be busy trying to meet more basic needs." He suggested that it was no accident that "Visions of a Sustainable World" was being held "in one of the wealthiest communities in the richest country in the world." He went on to say that perhaps "the single most important challenge facing humankind today is that of assisting the developing countries in raising their standard of

Left: Factories along the Ohio River pollute water and air. Right: Another tree falls in Borneo.

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living, while at the same time not exacerbating the environmental problems that the already developed countries created and are struggling with."

Portney insisted that many economists are dealing with the external costs mentioned by Kevles. "A number of my colleagues are now working with the Department of Energy and a number of foreign countries on an ambitious project to account for the full social costs associated with all elements of the various fuel cycles—not a theoretical project, an actual empirical project—in which we're trying to measure these adverse environmental effects and put them into the prices associated with products, so that when we make choices between various energy sources, we're doing so on a full social-cost basis." Similar work is being done with New York and other states on *environmental costing*—determining environmental and other social costs associated with new supplies of electricity.

He added that gross national product, the traditional measure of a nation's wealth, is not an unambiguous measure of social well-being because it doesn't take into account such costs.

John Ledyard continued the theme. Many of the problems being discussed, he said, involve what economists refer to as *public goods*, a term that refers to "commodities" such as air, water, or rain forests, where actions taken can affect large numbers of people because the effects of those actions are hard to avoid. Examples of such actions include pollution, overcrowding, disarmament, and behavior affecting biodiversity. "Suppose we could actually know and measure such effects on public goods," he asked. "What could we do?"

The first point he made is that "reliance on altruism is not enough." We cannot rely on individual decision makers—whether corporations, families, or nations—to make their contribution to preserving the supply of public goods. "People will not forego driving alone, they will not stop using products that cause ozone depletion—there's a lot of data, both historical and experimental, to suggest that telling them they're doing something wrong is not in itself enough to get them to stop doing it."

He summarized the research. "If everybody's interests are identical, if the group involved is small, and if people can communicate repeatedly face to face, then you can generally achieve 75 to 85 percent of what is optimal. But if there are asymmetric interests—for instance, if there are rich and poor—and if there are very large numbers—the world has large numbers—and if face-to-face communication is difficult, then all the evidence suggests that you may get a small rate of contribution, 10 to 15 percent of what's desirable." If grass-roots volunteerism is not the answer, though, what can be done?

"The standard knee-jerk economist's reaction is that free markets will solve the problem," Ledyard said, arguing that they wouldn't work either. "For example," he said, "suppose we want to stop harvesting the rain forest. Suppose everyone in this room is willing to pay for it—in fact, suppose a lot of people are willing to pay for it. Suppose we can identify who to pay—that is, suppose property rights are well defined and we

can identify the owners. Finally, suppose we can monitor whether or not cutting stops, so that we can make our payments contingent on this."

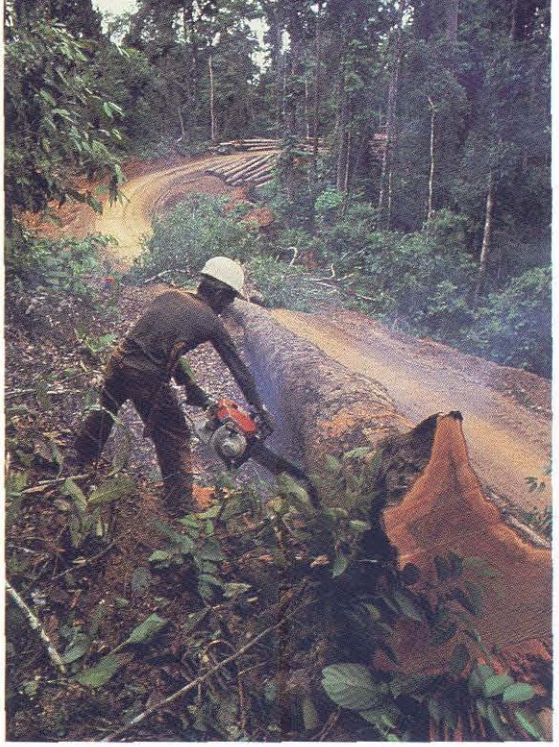
Even that would not be enough, he maintained. There would still be a fundamental problem, which he called "the free-rider problem." If everyone pays, the payment of any particular individual becomes correspondingly less important. Chances are individuals will try to cut their payments a bit. "If we all do this, we end up back in a situation where too little is paid and too much is cut." There's a fundamental problem in coordinating payments and making sure everyone contributes the appropriate amount, and "that's a problem that markets alone will not solve."

"What about political solutions?" he asked. Unfortunately, at the international level there is no single authority like the state of New York, or the United States, that can enforce compliance. Also, there are asymmetric effects: groups hurt by any imposed solution will resist it. In the end, solutions—whether political or economic—must be sustainable and must be voluntary. Individuals must agree to carry them out.

To Ledyard, the "nonoptimality" of currently predicted outcomes implies that "there's a possible reallocation of worldwide resources that would make everybody better off." In principle, for instance, a reduction in pollution can be achieved in such a way that "winners compensate losers, and everybody is a winner." The problem is communication. The market already tells tree cutters how much they'll get for cutting down a tree. "The part that's not being communicated is how much we are willing to pay to prevent that from happening."

If compensation is going to be contingent upon action, he added, technology will play a central role. The actions "of individuals who create these kinds of public externalities" will have to be measured and monitored—Earth-orbiting satellites represent a step in that direction. In addition, if compensation is to be provided in response to action, some kind of worldwide financial arrangement—most likely electronic—will be necessary.

"Finally, each of us must . . . be kept from trying to obtain a free ride." According to Ledyard, this will require new methods for calculating shared costs, "based on how much we said we would be willing to pay." In theory procedures already exist for doing this, but they are extremely complex. The important point is that any transition to a sustainable world must be based on the willing participation of all. "If we do the early part right, the last part should follow."



Roger Noll expressed a certain faith in self-interest—that people would recognize the problem of the global commons when they saw their own welfare at stake. But self-interest can also have deleterious effects on policy making. He pointed in particular to the tendency for environmental policies to be used for "allocating goodies" to the friends of those in office rather than for the purpose of carrying out the policies themselves. "We still have power plants burning hydrocarbon fuels in the most polluted basin in the world, when they ought not to be here anymore, and we are still using environmental policy as a mechanism for protecting investments in dirty technologies as opposed to creating mechanisms where people have a positive incentive to undertake investments in cleaner technologies."

The bright side of self-interest is that people might possibly recognize the opportunity for mutual gain. An example of such insight is the agreement between the United States and Canada to control acid rain. The agreement utilizes economic incentives combined with the coercive power of two nations, which highlights the fact that a certain loss of sovereignty by both the United States and Canada was required in order to solve a mutual problem. Unfortunately, said Noll, the world trend today does not favor increasing aggregations of nation-states. Nation-states are disintegrating in eastern Europe and in parts of the developing world, and in the United States itself the tendency is toward fragmentation, and deregulation at the federal level. There is a conflict of values. "How do we overcome this

tendency toward decentralization in order to solve these kinds of problems?"

An equal problem is that of impatience, of "ever-foreshortening time horizons," which Noll to a certain extent credited to a kind of Malthusian doom-and-gloom outlook. If that outlook is true, he said, "then in fact saving is not rational because the instruments of saving themselves become consumed and valueless. You can't rely upon your stocks and bonds or even your capital investments to provide you with anything in the future, because the consequence of the Malthusian state is that you will ultimately be in a permanent state of abject poverty no matter what." He felt that our tendency to institutionally and economically obstruct benign technologies, and encourage dirty technologies, was making "the Malthusian doom-and-gloom version of the resource-management problem . . . more likely to be true."

Alvaro Umaña was, in his own words, "a little harsher than the previous speakers" regarding the role of economists in dealing with the problem of the global commons. "Although economists individually have recognized problems," he said, "collectively economic science has not really dealt with this in a serious way." More damaging, he added, was the fact that concern with "externalities" has not made its way into the realm of economic policy. "In most of the tropical world, a tree is not a capital good like a tractor or a cow. You can't go to the bank and say, I have this forest and would like to manage it sustainably, and I would like to use the forest as collateral for a loan to do this. You can do that with tractors or cows, but not with trees." He went on to talk about his tenure as a government minister in Costa Rica. "Many people came to me and said, 'You are stopping me from cutting my trees.' I said, 'Did you plant those trees?' Not once did they say yes." For those who might wonder whether it's really necessary to pay such people not to cut, Umaña pointed out that under present concepts of property rights, in Costa Rica and elsewhere, we must. Otherwise the "owners" of the trees have nothing better to do than simply cashing in what amounts to natural capital. "It's much cheaper in the short run just to cut the trees and invest in something else. That's why we are losing the forests . . . all forests."

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Umaña went on to say that one of the most important global environmental services provided by trees is that of carbon storage. Europe and Japan have both decided that carbon dioxide emissions must be stabilized, but the United States doesn't want to go along: the United States, said Umaña, is the biggest free-rider in the world today with respect to the atmosphere, emitting five tons of carbon dioxide per person per year, which can be compared to the 0.2 to 0.5 tons per person per year emitted by the developing world. What's needed, he declared, is a treaty to link fossil-fuel usage with solutions to reduce carbon dioxide emissions. He proposed that a carbon tax of a dollar per barrel—that works out to about a nickel per gallon of gasoline—could generate 60 billion dollars a year to finance energy-efficiency and biomass-buildup programs. "In Costa Rica, for example, we have calculated that we can remove a ton of carbon from the atmosphere by planting trees and forests, for $10 to $12 per ton." With the nickel tax "we could remove two to three tons of carbon for each ton of fossil fuels burned. . . . The developing countries could get a tremendous amount of positive benefit from removing this carbon by planting forests—in the North, this could be sold as action against global warming, and in the South, this could be sold as rural development." Similar arrangements that paid developing countries for the sustainable use of their resources would also go a long way to protect biodiversity, he maintained.

He stressed that economics must be reformed. "Less than 10 years ago, the economic textbooks dealt with air and water as free goods. You still can find textbooks that talk about free goods." According to traditional theory, "value arises out of individual consumers choosing among baskets of goods. But these baskets do not include environmental resources and services.

"We have to change that." □